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(54) Method and apparatus for producing carpeted panels.

(57) Carpeted panels comprising a thermoplastic substrate (12) and a synthetic fiber carpet (14) are produced by bonding the respective parts to one another using a vibration welding apparatus for causing the generation of frictional heat at the interface between the substrate and the carpet. One of the platen (20) of the welding apparatus confronting the carpet is provided with a pattern of closely spaced pins (30) engaging the carpet and urging the carpet into forced engagement with the substrate. On account of the closely spaced pins and the relatively low amplitude of the reciprocating motion, a bond is achieved substantially over the entire interface between the carpet and the substrate.

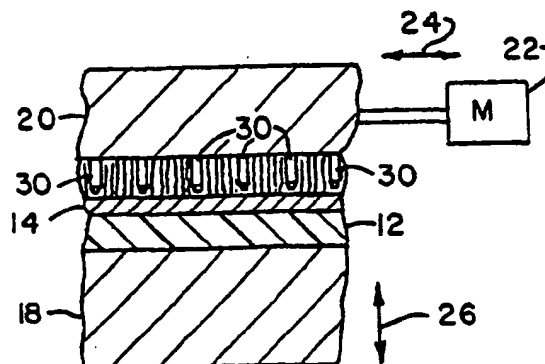


FIG. 2.

Table 1

	<u>Carpet Backing Material</u>	Substrate Material		
		ABS	PP	PE
5	Latex	X	X	X
	Polyethylene (PE)	-	X	X
	Polypropylene (PP)	-	X	O
10	None (Unbacked)	O	X	O
	Note: X Compatibility			
	O Some Compatibility			
	- Limited Compatibility			
15	ABS - acrylonitrile, butadiene and styrene			

20 Carpets which have no separate backing layer can be welded also to a substrate as long as the fibers comprise thermoplastic material, such as nylon or polypropylene, which materials soften and flow in response to the dissipation of frictional heat and then will adhere and bond with the substrate upon cooling.

25 In an alternative embodiment, the platen 20 can be stationary and the platen 18 be subjected to the translating reciprocating motion without departing from the principle of the invention. However, the pins 30 must be disposed to engage the carpet for causing the intimate engagement between the carpet and the substrate.

Using the above stated parameters, automobile kick panels have been manufactured successfully using a polypropylene substrate 42 inches long, 3 1/2 inches wide and 3/16 inch thick. The frequency of the welding apparatus was 240 cycles per second at a displacement amplitude of 0.060 to 0.070 inch peak-to-peak.

30 While there has been described and illustrated a preferred embodiment of the invention and several modifications thereof, it will be apparent to those skilled in the art that various further changes and modifications may be made without departing from the principle of this invention, which shall be limited only by the scope of the appended claims.

### 35 Claims

1. The method of producing a carpeted panel characterized by:  
superposing upon one another a substrate of thermoplastic material and a carpet made of thermoplastic material adapted to bond to said substrate responsive to the generation of frictional heat at the interface between said substrate and said carpet;  
40 providing forced engagement between said carpet and said substrate which includes using a pattern of closely spaced pins engaging said carpet, and  
subjecting said substrate and carpet while in forced engagement to translating reciprocating motion relative to one another for a predetermined time interval for causing during said interval the generation of frictional heat, whereby upon cessation of said motion and the dissipation of said heat said carpet is bonded to said substrate.
2. The method of producing a carpeted panel as set forth in claim 1, said pins engaging the side of the carpet from which the filaments of the carpet are upstanding.
- 50 3. The method of producing a carpeted panel as set forth in claim 1, said pattern of closely spaced pins comprising nine to eighty-one pins per square inch.
4. The method of producing a carpeted panel as set forth in claim 1, each of said pins having a height of at least 1.1 times the thickness of the carpet.
- 55 5. The method of producing a carpeted panel as set forth in claim 1, the peak-to-peak amplitude of

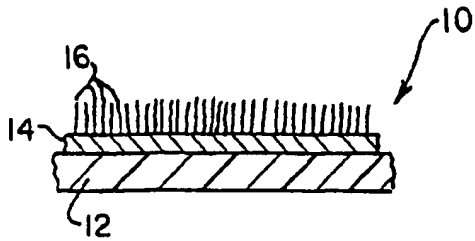


FIG. 1.

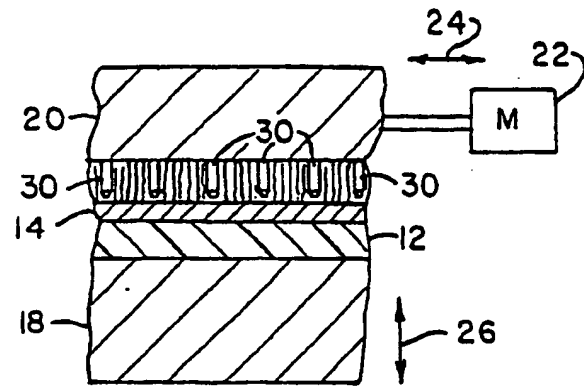


FIG. 2.

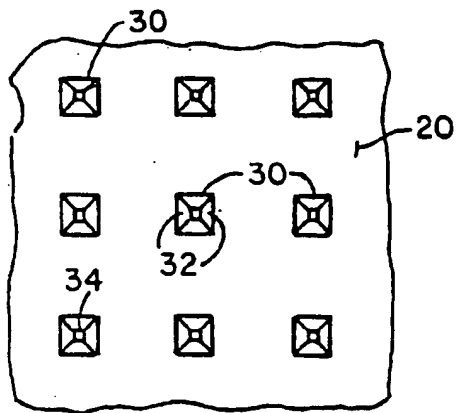


FIG. 3.

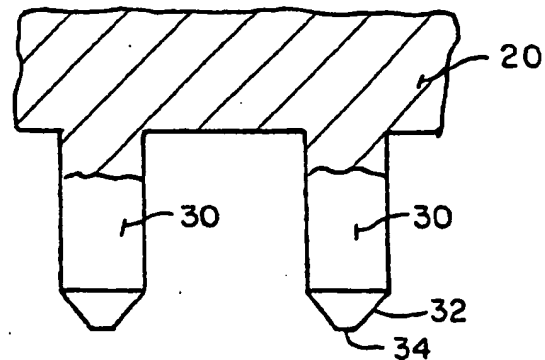


FIG. 4.

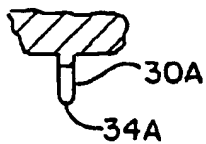


FIG. 5.

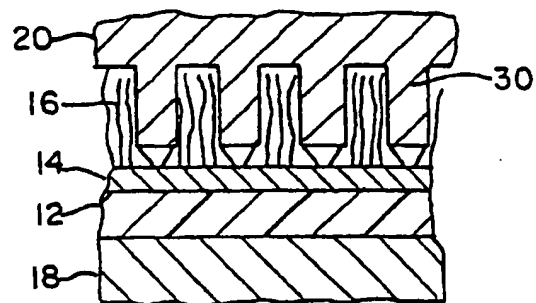


FIG. 6.